

NEW TERTIARY INSECTS.

By T. D. A. COCKERELL,

Of the University of Colorado, Boulder.

The insects now described come from three different localities and horizons. One species was obtained by the United States Geological Survey in the oil shales (Eocene) of western Colorado. Others are from Florissant, Colorado, where they were obtained in the well-known Miocene shales. These include, in addition to a number of new species, new genera of Diptera and Hymenoptera. All the above are in the United States National Museum, but I have also included some descriptions of species from the Oligocene of Gurnet Bay, Isle of Wight, England, transmitted for examination by the British Museum, through the kindness of Dr. F. A. Bather. These came originally from the collection of the Rev. P. B. Brodie, as did those in the United States National Museum which I recently described in these proceedings.¹

DIPTERA.

RIPHIDIA BRODIEI, new species (Tipulidae).

Plate 31, fig. 2.

Wing about 5 mm. long and 1.5 wide, pale brownish, with very faint clouds at ends of first marginal and first basal cells; costa with minute bristles, but no evident bristles on the veins; venation almost exactly as in *R. maculata* Meigen. The following wing measurements are in microns: first basal cell on first marginal (not allowing for curve) 770; first basal on submarginal (not allowing for curve) 432; first basal on first posterior, 130; first basal on discal, 336; upper side of discal cell, 640; discal on second posterior, 130; discal on third posterior, 320.

Oligocene: Gurnet Bay (Brodie). British Museum, I. 8603.

MONGOMA CRUCIFERELLA, new species (Tipulidae).

Plate 31, fig. 3.

Wing about 5 mm. long, hyaline, without spots, veins brown; venation agreeing in general character with living *Mongoma*, the anterior cross-vein apparently absent (fused with R_{4+5}); veins at apex of first

¹ Proc. U. S. Nat. Mus., vol. 51, 1916, pp. 89-106.

marginal cell forming a cross or X, R_2 proceeding from the apical point of the cell; veins apically limiting basal cells oblique, in a straight line with one another, exactly as in *M. niveitarsis* Alexander. The following measurements are in microns: length of first marginal cell, 1950; first basal on submarginal, 400; apical side of first basal, 224; apical side of second basal, 320; first marginal on first submarginal, 800.

Oligocene: Gurnet Bay (Brodie). British Museum, I. 8635. The X at end of first marginal cell is distinctive. The position of R_2 shifts in various members of the genus. In *M. pallida* Williston and *M. fragillima* Westwood it separates considerably beyond the end of first marginal cell, but in *M. niveitarsis* it is before (basad of) the tip of that cell, or rather originates from the upper corner of the truncate tip. The genus *Mongoma* is today tropicopolitan, and on account of the diversity of venation has been divided by authors, but Alexander shows that the groups grade into one another.

TIPULA GARDNERI, new species (Tipulidae).

Plate 31, fig. 1.

Wing about 18 mm. long and 4 wide, the apex low down, giving the wing a subfalcate appearance; no distinct markings but a dark gray stigmatic cloud, the end of which is 5 mm. from apex of wing; second vein (R_{2+3}) not evidently turned upward at end; third vein going to wing tip; costal vein bounding marginal and submarginal cells very strong and dark; discal cell rather long and narrow, as in some of the American Miocene (Florissant) species; fifth posterior not quite touching discal.

Oligocene: Gurnet Bay (Brodie). British Museum, I. 8663. This is readily known from the species of Baltic amber by its size. It is named after J. S. Gardner, who is known for his work on the Tertiary plants of England.

BIBIO WICKHAMI Cockerell (Bibionidae).

A new specimen from Florissant (U.S.N.M.) has the following characters: Length about 11.25 mm.; wing, nearly 7; head, thorax, and legs, black; abdomen, reddish brown, with broad hyaline bands, which are about half as wide as the intervals between them; wings hyaline, the costal field broadly suffusedly brownish, a large dusky stigmatic spot. Wing measurements in microns: Third vein before anterior cross-vein, 640; third vein beyond cross-vein, 3,520; cross-vein, 80; width of first posterior cell at level of end of third vein, 640; width of second at same level, 608; third posterior cell on wing margin, 1,280.

BIBIO GURNETENSIS, new species.

Plate 31, fig. 4.

Wing about 5 mm. long, clear hyaline, stigmatic region pale brownish, venation normal for the genus. The following measurements are in microns: Upper apical side of first basal cell, 145; lower apical side (on first posterior) of first basal, 640; second basal on first posterior cell, 960; second basal on fourth posterior, 1,040.

Oligocene: Gurnet Bay (Brodie). British Museum, I. 8641. The apical sides of the first basal cell (the upper short, the lower, or cross-vein, long) are like those of the Florissant fossil *B. atavus* Cockerell. Meunier lists no species of *Bibio* from Baltic amber.

BIBIO OLIGOCENUS, new species.

Plate 31, fig. 5.

Wing about 8 mm. long, fuliginous; the whole costal region very dark. Venation normal for the genus. Stem of vein, 2-3 before discal cross-vein 896 microns long, and discal cross-vein only 256 microns. Lower end of discal cross-vein 1,440 microns apicad of level of basal corner of fourth posterior cell.

Oligocene: Gurnet Bay (Brodie). British Museum, I. 8650. Readily distinguished by the dark wings and the venation as described.

PLECIA WINCHESTERI, new species (Bibionidae).

Wing about 7.3 mm. long and 3 broad, dilute fuliginous; third vein rather strongly arched; anterior cross-vein shorter than distance from it to fork of fourth vein. A broad-winged species of normal type. The following measurements are in microns: Third vein from origin (separation from first) to anterior cross-vein, 1,520; third vein from anterior cross-vein to fork, 1,330; length of upper branch of third vein (second vein), 960; third vein from fork to end (lower branch) 2,240; length of anterior cross-vein, 240; anterior cross-vein to fork of fourth, 400; fourth posterior cell on wing-margin, 1,490. The second posterior cell on upper side is slightly over 3 mm. long.

Oil shales (Eocene), banks of Hay Gulch (S. E. quarter of section 36, township 1 N., Range 96 W), Colorado, September 9, 1914 (D. E. Winchester), United States Geological Survey. This is very possibly the female of *P. woodruffi* Cockerell, but if so, this can not be proved, and as the locality is different, I give it a distinctive name. The wing is colored exactly like that of *P. fulvicollis* Fabricius, from Los Banos, Philippine Islands (Baker).

Type.—Cat. No. 62535, U.S.N.M.

PLECIA EXPLANATA, new species.

Male.—Length, about 7.3 mm. as preserved, but end of abdomen gone; black or dark brown, abdomen not banded; wings quite long and narrow, 8 mm. long and 2.9 broad, dusky; anterior femora very robust. Anterior cross-vein shorter than distance from it to fork of fourth; anal cell narrowly open. The following measurements are in microns: Depth of marginal cell at level of anterior cross-vein, 368; third vein from origin to fork, 2,400; third vein from fork to end (lower branch), 2,320; length of upper branch of third (second vein), 800; depth of submarginal cell at level of end of second vein, about 288; third vein from origin to anterior cross-vein, 1,330; length of anterior cross-vein, 240; anterior cross-vein to fork of fourth, 320; base of third posterior cell to basal corner of second, 1,200; fourth posterior cell on wing-margin, about 1,440.

Florissant, in the Miocene shales. A relatively narrow-winged species, readily known from the other Florissant forms by the measurements.

Type.—Cat. No. 62536, U.S.N.M.

ACREOTRICHITES, new genus (Bombyliidae).

Small flies allied to *Acreotrichus* Macquart; body not hairy; thorax robust, elevated in profile; abdomen rather slender; antennae with very long black hair, arranged nearly as in *Acreotrichus*, the first two joints densely hairy, the third long-pyriform, with a tuft of long hair. Wings with four posterior cells, all wide open; second submarginal very long and narrow, flaring apically; second vein not turned up at end; discal cell small, the anterior cross-vein much before its middle; praefurca short; anal cell very broad, closed a short distance before wing-margin.

Type of the genus.—*Acreotrichites scopulicornis*, new species.

ACREOTRICHITES SCOPULICORNIS, new species.

Plate 31, fig. 6.

Length, 4.5 mm.; wing, 3 mm.; black, with smoky wings. The following measurements are in microns: Praefurca, about 350; length of second submarginal cell on lower side, 1,010; basal corner of second submarginal apical of vertical level of end of discal cell, 112; discal cell on first posterior, 656; discal on first basal, about 320; discal on fourth posterior, 480; width of anal cell at level of base of fourth posterior, 320; posterior cells on wing-margin, first and second, each 240, third 480, fourth 832. Vein separating discal cell from third posterior having a double curve (as in *Systropus foenoides*).

Florissant, in the Miocene shales. It was preserved on the same piece of shale as *Urortalis caudatus*, about 25 mm. away from it.

Type.—Cat. No. 62537, U.S.N.M.

The genus *Acreotrichus* was based on the Australian *A. gibbicornis* Macquart. The fossil is evidently allied, but generically distinct. *Acreotrichus atratus* Coquillett, from the State of Chihuahua, Mexico, appears to represent a third genus; I examined the type some years ago in the United States National Museum. All these flies are very easily known from *Phthiria* by the remarkable antennae. The three genera may be separated thus:

- Anterior cross vein much before middle of discal cell; second submarginal cell long and narrow, not truncate at base..... *Acreotrichites*, new genus.
 Anterior cross-vein beyond middle of discal cell..... 1
 1. Anterior cross-vein not far beyond middle of discal cell; second submarginal cell not truncate at base; third antennal joint about three times as long as the first two together..... } *Neacreotrichus*, new genus (type, *Neacreotrichus atratus* = *Acreotrichus atratus* Coquillett).
 Anterior cross-vein far beyond middle of discal cell; second submarginal cell truncate at base, with an appendicular nervure directed basad from its upper basal corner; third antennal joint not nearly three times as long as first two together.
Acreotrichus Macquart.

MESOMYITES, new genus (Empididae).

Minute flies with narrow wings (shaped much as in *Toreus*); second vein short, directed obliquely upward, reaching costa far from apex of wing; third vein long, simple; praefurca very long; discal cell long, complete, emitting three veins from its apical part; anterior cross-vein near base of discal cell; four posterior cells; lower apical corner of second basal level with apex of first basal cell; anal cell apparently wide open on margin. Third vein obliquely deflected between separation of second and anterior cross-vein.

Type of the genus.—*Mesomyites concinnus*, new species.

MESOMYITES CONCINNUS, new species.

Plate 31, fig. 7.

Wing about 3 mm. long, hyaline, veins brown; costa minutely bristly. The following measurements are in microns: Width of wing, 850; basal end of praefurca to apex of wing, 2,144; end of second vein to level of tip of wing, 1,170; upper side of first posterior cell, 1,360; marginal cell on submarginal, 400; first posterior on discal, 720; first posterior on second posterior, 690; first posterior on wing margin, 128; second posterior on wing margin, 240; second posterior on third, 560; width (depth) of discal cell, 112; discal on second posterior, 80; discal on third posterior, 112; discal on fourth posterior, 640; apex (upper apical corner) of second basal apicad of level of apex of first basal, 128. The last 640 microns of anal vein are visible, without any sign of a closed anal cell. At the upper basal

corner of fourth posterior cell are three little cells, representing an abnormality only.

Oligocene: Gurnet Bay (Brodie). British Museum, I. 8666. This minute fossil fails to show the base of the wing, but most of the venation is very well preserved. I can only interpret it as a relative of *Mythicomylia*, which has the same type of second vein, only more extreme. In *Mythicomylia* the third vein may be a little deflected at the anterior cross-vein, or it may be straight. The anal cell is usually closed, but Cresson shows that it may be narrowly open. The shape of the wing in *Mythicomylia* is very different from that in the fossil. Cresson and others place *Mythicomylia* in the Empididae, and the fossil must be referred to the same family.

RHAMPHOMYIA HYPOLITHA, new species (Empididae).

Plate 31, fig. 8.

Male.—Length, 6 mm.; wings, 4 mm.; head, thorax, and legs black; abdomen slender, dark brown; wings dusky, but not fuliginous; proboscis directed downward, somewhat longer than head; antennae about 608 μ long, the end formed as in *R. sepulta*. Praefurca very short, strongly curved; anterior cross-vein before middle of discal cell; anal cell as usual in the genus. The following measurements are in microns: Praefurca, not allowing for curve, about 176; submarginal cell at apex, not allowing for curve of margin, 880; first posterior cell on wing margin, 400; second posterior on margin, 560; basal corner of discal cell basad of vertical level of end of praefurca, 96; first basal cell on submarginal, 240; first basal on discal, 320; first posterior on discal, 560; total length of discal, 880.

Florissant, in the Miocene shales. Easily known from *R. sepulta* Cockerell, the other Florissant species, by the wing measurements.

Type.—Cat. No. 62538, U.S.N.M.

URORTALIS, new genus (Ortalididae).

A genus of the subfamily Richardiinae, with extremely long, tapering ovipositor; wings without any conspicuous markings. Costa minutely bristly; auxiliary vein approaching costa very obliquely; first vein without bristles; second vein straight at end (not curved upward as in *Richardia*); first posterior cell not at all contracted apically; superior apical corner of discal cell forming an obtuse angle. Hind femora stout; whether toothed or not can not be determined. The venation, except for the shape of the first posterior cell, is nearly as in *Epiplatea*; as in that genus the basal costal region is large, not narrowed as in *Stenomacra*. The region of the anal cell is extremely obscure, but it seems to be short and truncate or subtruncate. This is not a very satisfactory genus, the characters of the

head, so important in this group, being wholly obscure. At the same time, it is a remarkable insect, and it seems impossible to refer it with any assurance to a living genus.

Type of the genus.—*Urortalis caudatus*, new species.

URORTALIS CAUDATUS, new species.

Plate 31, figs. 9, 10.

Female.—Body apparently black; thorax about 4 mm. long; abdomen, with the long slender ovipositor, about 7.5 mm. Wings about 4.4 mm. long, hyaline, with broad but extremely faint clouding along the veins. The following measurements are in microns: End of auxiliary vein to base of wing, about 1,360; end of auxiliary vein to end of first, about 720; end of first to vertical level of tip of wing, 2,480; first basal cell on submarginal, 1,470; first basal on first posterior, 176; width of first posterior near middle, 448, and at apex, 528; discal on first posterior, 960; discal on second posterior, 576.

Florissant, in the Miocene shales.

Type.—Cat. No. 62539, U.S.N.M.

MELIERIA ATAVINA, new species (Ortalididae).

Robust, dark brown, about 8 mm. long, wings a little over 6 mm. The thoracic bristles can not be made out, but the characteristic long bristles, curved backward, on the top of the head, are plainly visible. Wing pattern very distinct, essentially as in *M. obscuricornis* Loew, except that the apical patch is formed as in *M. ochricornis* Loew, and there are two bands on the basal part of the wing, one broad, the other (more basal) small. The broader of these bands is well represented in *M. similis*, but does not extend right across the wing as in the fossil. First posterior cell contracted apically, though widely open; anterior crossvein far toward end of discal cell (as in *Richardia*); anal cell with the end transverse and bulging (much as in *Coelometopia*), and a considerable distance basad of end of second basal. The following measurements are in microns: End of second vein to end of third, in a straight line, 1,120; length of anterior cross-vein, 480; length of upper side of discal cell, 1,872; base of discal cell to end of anal, 400; discal on first posterior, 480; apical side of discal cell, 800. End of prae-furca very slightly basad of level of apex of anal cell.

Florissant, in the Miocene shales. Although this is a prettily marked fossil, the structural characters are hard to discern. The shortness of the anal cell as compared with the second basal, as well as its form, might indicate a genus distinct from *Meliera*, but the general resemblance to *Meliera* is so striking that the generic reference seems almost obligatory.

Type.—Cat. No. 62540, U.S.N.M.

PROTOSCINIS, new genus (Chloropidae).

Minute flies closely resembling *Botanobia* (*Oscinis*), but second vein leaving first basal cell very near its base, and anterior cross-vein much before middle of combined discal and second basal cell. Costal vein going as far as tip of fourth; costa with small stiff black bristles, about six in 80 microns; second vein straight, faintly curved upward at end; third and fourth veins not converging distally; lower side of discobasal cell not at all bulging outward (downward).

Type of the genus.—*Protoscinis perparvus*, new species.

PROTOSCINIS PERPARVUS, new species.

Plate 31, fig. 11.

Thorax robust, black, 640 microns wide; wing 1728 microns long, hyaline. The following measurements are in microns: Base of wing to end of first vein, 512; width of submarginal cell at level of end of second vein, 192; third vein from level of end of second to tip of wing, 352; first posterior cell on wing margin, 192; width of first posterior cell at level of end of discobasal, 160; first posterior on discobasal, 416; total length of discobasal, 560; second posterior on discobasal, 160.

Oligocene: Gurnet Bay (Brodie), British Museum, I. 8632.

The venation is not very different from that of *Ops glaberrima*, as figured by Lamb. Possibly the fossil could be referred to *Ops*, but that name is preoccupied.

ANTHOMYIA (sens. lat.) **PERSEPULTA**, new species.

Length 5.7 mm., wing, 4.3 mm.; robust, black or dark brown, wings dusky; abdomen thinly beset with long bristles; hind tibia with a few long bristles on posterior margin; eyes (in lateral view) semicircular; mouth parts and palpi as in *Anthomyia*. Wings broad; venation normal; auxiliary vein strong, only close to first vein toward base; upper apical angle of discal cell a right angle; upper basal angle of second posterior cell an obtuse angle; first posterior cell scarcely at all contracted apically. The head is small, in lateral profile (including position and shape of eye) nearly as in male *Phyllogaster cordyluroides*, though not so high. The following measurements are in microns: Base of wing to end of auxiliary vein, about 1040; submarginal cell on wing margin (not allowing for curve), 752; base of wing to anterior cross-vein, about 1552; anterior cross-vein to upper apical corner of first posterior cell, 2560; width of first posterior about middle, 544; first posterior on discal, 830; second posterior on discal (the apical side of which is straight), 560; lower apical corner of discal to wing-margin.

Florissant, in the miocene shales. Closely resembles *A. atavella* Cockerell, but easily distinguished by the dusky wings, strong auxiliary vein ending much nearer base of wing, and thorax longer and less convex in profile. It certainly represents a distinct genus from *A. atavella*, but it is impossible to place these fossil Anthomyidae in the genera of modern authors, which are separated principally on characters we can not see.

Type.—Cat. No. 62541, U.S.N.M.

THYSANOPTERA.

AEOLOTHRIPS BRODIEI, new species (Aeolothripidae).

Plate 31, fig. 12.

Length about 1.3 mm.; head and thorax poorly preserved; abdomen large, dark brown, with hyaline sutural bands (caudal bristles not visible, being embedded in rock); wings short, not nearly reaching end of abdomen; venation as usual in the genus, the two longitudinal veins very distinct, the first, at least, with minute bristles; cross-veins placed practically as in *Orothrips kelloggii* Moulton, the one connecting the longitudinal veins oblique as in that species; the cross-veins from first longitudinal to costa are subobsolete, but two seem to be indicated, the two from second vein to lower margin are more distinct; the bristles of the costal region are short, and those of apex and inner margin are less than twice as long. Wings pale brownish, not banded, veins brown. The following measurements are in microns: Length of abdomen, 975; width of abdomen, 400; width of wing, 175; length of costal bristles, 32; length of bristles at apex of wing, 50; cross-vein between longitudinal veins to second cross-vein from second longitudinal to margin, 160; second cross-vein from second longitudinal to margin to end of second longitudinal, 175.

Oligocene: Gurnet Bay (Brodie; British Museum, I. 8547). This may not belong to *Aeolothrips* in the most restricted sense, but it appears to show no distinctive characters excluding it from the genus. In the absence of banding on the wings it resembles *Ankothrips* Crawford, but that has narrower, much more bristly wings.

NEUROPTERA.

SISYRA(?) DISRUPTA, new species (Hemeroptidae).

Plate 31, fig. 13.

Represented by part of the apical region of a wing which must have been about 5 mm. long. It appears to be referable to the Sisyrinae (Sisyridae Handlirsch), and has exactly the texture and general appearance of the wing of modern *Sisyra* (*S. vicaria* Walker, collected

by N. Banks at Great Falls, Maryland, compared), with the very prominent spurious veins between the real ones. The venation, however, differs in detail. R_2 has a long fork, but R_3 and R_4 , more as in *Micromus*, are forked so briefly as to appear simple, the apical margin of the wing not being preserved. The very complicated R_5 (as I understand Needham's nomenclature) has the first branch divided, each division again forked, while the other two branches are each forked. The first fork of the media only is visible. The following measurements are in microns: Fork of R_2 across wing to fork of first branch of R_5 , 800; fork of first branch of R_5 to margin of wing, 1600, the upper and lower cells in the secondary forks of its branchlets, respectively, 865 and 320 long; length of cells in forks of second and third branches of R_5 , each 480; length of cell in first fork of media, 560. These cells are measured from fork to middle of margin.

Oligocene: Gurnet Bay (Brodie). More perfect material may indicate a distinct genus. The species is very different from *S. relicta* Hagen and *S. amissa* Hagen, found in Baltic amber. The specimen is in the British Museum (I. 8644.) A wing of the ant *Oecophylla atavina* Cockerell is on the same small piece of rock.

HYMENOPTERA.

TAENIURITES, new genus (Tenthredinidae).

Body elongated, parallel-sided, the abdomen bandlike, the middle segments more than twice as broad as long; head rather small; antennae long, not very slender; hind femora inserted beneath third abdominal segment, short, not reaching beyond fifth. Anterior wings with costal cell distinct, the transverse vein stout, oblique, a little basad of insertion of basal nervure, as in MacGillivray's figure of *Macrophya*; basal nervure inserted far from origin of cubital (as in *Hoplocampa*); basal and first recurrent nervures parallel; marginal cell with cross-vein arched upward or outward (as in *Macrophya*), inserted near beginning of last third of third submarginal cell; second submarginal cell very long, receiving first recurrent nervure a short distance before middle; third submarginal greatly broadened apically, with the lower apical corner produced (style of *Macrophya*); median vein (cubitus) bent or angled at origin of basal nervure, its basal part straight (style of *Stromboceros*); basal nervure some distance basad of transverse-median (as in *Stromboceros*); second discoidal cell with its side on first discoidal much longer than that on third (as in *Macrophya*); lanceolate (anal) cell without any cross-nervure, narrowed subbasally by the upward bending of its lower nervure, the bend gradual, not at all abrupt. Hind wings with the lower apical corner of the median cell just before the end of the broad anal (as in *Strongylogaster*), but the upper apical corner more produced (as in

Emphytus); end of subcostal cell (media of MacGillivray) produced, its face on radial longer than that on discoidal, that on cubital very short (style of *Macrophya*); cubital very long, receiving second recurrent nervure well before its middle (approach to condition of *Macrophya*).

In the tables by MacGillivray, Rohwer, etc., this runs positively to Selandriinae, and on account of the form of the body falls in the division Strongylogasterini (Strongylogasterinae of Ashmead). On the other hand, many details of the venation are like those of *Macrophya*, to which the insect runs in Cresson's table, except as to the character of the hind legs. The genus, therefore, seems to combine the characters of the Selandriinae and Tenthredininae, and to lend support to Ashmead's opinion that the Strongylogasterinae should be associated with the latter rather than with the true Selandriines.

Type of the genus.—*Taeniurites fortis*, new species.

TAENIURITES FORTIS, new species.

Plate 31, fig. 14.

Length, 14 mm.; anterior wing, 11 mm.; antennae, about 6 mm.; width of abdomen, 3.7 mm.; head and thorax black; abdomen apparently reddish, infuscated apically; wings hyaline. The following measurements are in microns: Anterior wings: First marginal cell on third submarginal, 1,056; second marginal on third submarginal, 336; basal nervure on first discoidal, 864; end of basal to beginning of cubital, 849; first submarginal on first discoidal, 800; second submarginal on first discoidal, 704; second submarginal on third discoidal, 1,040; third submarginal on third discoidal, 544; lower side of third submarginal beyond second recurrent nervure, 1,136; second discoidal on first, 1,616, and on third, 800. Hind wing: Cubital cell on discoidal, 880; lower side of cubital beyond discoidal, 1,170.

Florissant, Miocene shales.

Type.—Cat. No. 62542, U.S.N.M.

Among all the fossil sawflies from Florissant, this closely resembles only *Macrophya pervetusta* Brues, from which it is distinguished by the parallel-sided (not at all oval) abdomen and the form of the lanceolate cell.

HERIADES PRISCUS, new species (Megachillidae).

Female.—Robust, hairy, black, about 11.5 mm. long; anterior wing, 6 mm. or a little over; wings, hyaline; scape rather short, probably about 850 microns; flagellum thick, 240 microns broad near middle. Stigma well developed; two submarginal cells; second (morphologically third) transversocubital nervure with a double curve, its lower part strongly bulging outward; distance from end of second recurrent nervure to lower end of second transversocubital

less (95μ) than distance from lower end of first transversocubital to insertion of first recurrent (128μ),—a character of *Heriades* proper as against *Chelostoma*; second recurrent nervure with an even, gentle outward curve; lower end of basal nervure curved, and the transversomedian (which is 400μ long) in a straight line with it, its upper part vertical, but the lower end curved basad, as is characteristic of *Heriades*. The following measurements are in microns: Width (depth) of stigma, 160; width (depth) of marginal cell, 368; marginal cell on first submarginal, 320, and on second, 448; total length of second submarginal cell, 850; first submarginal cell on basal nervure, about 288, and on first discoidal cell, 816; second submarginal cell on third discoidal, 672; basal nervure on first discoidal cell (not allowing for curve), 752.

Florissant, in the Miocene shales. The largest Florissant *Heriades*.
Type.—Cat. No. 62543, U.S.N.M.

EXPLANATION OF PLATE 31.

- FIG. 1. *Tipula gardneri*, new species. Oligocene, Gurnet Bay, Isle of Wight.
2. *Riphidia brodiei*, new species. Discal cell and adjacent parts. Oligocene, Gurnet Bay, Isle of Wight.
3. *Mongoma cruciferella*, new species. Oligocene, Gurnet Bay, Isle of Wight.
4. *Bibio gurnetensis*, new species. Oligocene, Gurnet Bay, Isle of Wight.
5. *Bibio oligocenus*, new species. Oligocene, Gurnet Bay, Isle of Wight.
6. *Acreotrichites scopulicornis*, new species. Antenna. Miocene (Florissant), Florissant, Colorado.
7. *Mesomyites concinnus*, new species. Oligocene, Gurnet Bay, Isle of Wight.
8. *Rhamphomyia hypolitha*, new species. Miocene (Florissant), Florissant, Colorado.
- FIGS. 9, 10. *Urotales caudatus*, new species. 10. Discal cell and adjacent parts. Miocene (Florissant), Florissant, Colorado.
- FIG. 11. *Protosciniis perparvus*, new species. Discal cell and adjacent parts. Oligocene, Gurnet Bay, Isle of Wight.
12. *Aeolothrips brodiei*, new species. Oligocene, Gurnet Bay, Isle of Wight.
13. *Sisyra (?) disrupta*, new species. Oligocene, Gurnet Bay, Isle of Wight.
14. *Taeniurites fortis*, new species. Lanceolate cell, etc., of anterior wing. Miocene (Florissant), Florissant, Colorado.